

CASELLA & HESPOS LLP
Attorneys at Law
274 Madison Avenue
Suite 1703
New York, New York 10016

Date: July 26, 2004

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Name: Examiner Egan, B.
Firm: Commissioner for Patents
City & Country: Alexandria, Virginia
Telephone No.: (571) 272-1491
Facsimile No.: (571) 273-1491
Atty. Ref.: 2282-US - U.S. Patent Appl. No. 09/918,652
From: Gerald E. Hespos **Business Phone:** (212) 725-2450

Dear Mr. Egan:

This transmittal includes a copy of the executed Declaration that we discussed. I will be on vacation for a week. However, I will return to my office on August 3, 2004 if you would like to discuss any of this.

Very truly yours,

Gerald E. Hespos

Gerald E. Hespos

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Atty. Ref.: 2282-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Wen-Chen Su et al.
Appl. No. : 09/918,652
Filed : March 22, 2000
For : METHOD FOR FORMING MULTILAYER RELEASE LINERS AND
LINERS FORMED THEREBY

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR § 1.132

I, Adrian Hulme, am a citizen of the United Kingdom of Great Britain and Northern Ireland and reside at 5734 North Winds Drive, Apt. 9, Mentor on the Lake, Ohio 44060. I received a Bachelor of Science (honors) in Chemistry from the University of Lancaster, and I have worked in plastics industries for twenty-six years. I currently am employed as Component Program Manager of Fasson Roll North America. I am one of the named inventors on this application.

I am an inventor in the above-captioned application, and I am familiar with the application. I also studied U.S. Patent No. 5,229,212 (the Reed patent) which has been cited during the prosecution of the above-identified application.

I have conducted tests to compare sample liners prepared in accordance with the specification of the Reed patent with sample liners prepared in accordance with the specification and claims of the above-captioned application. The following paragraphs describe the sample preparation and tests performed on the samples.

The specification of the Reed patent indicates that the silicone release coating described therein is produced from an aqueous emulsion of a curable silicone. The specification states that the silicone is not limited to any particular type and that silicone suitable for use in producing release coatings are well known in the art. The silicone I used in the preparation of all samples to be tested (Reed and the subject application) was Dehesive 451 from Wacker Chemie which is a platinum catalysed, surfactant stabilized dispersion of a vinyl end-blocked siloxane polymer.

Reed Patent

A solution of polyethylene oxide (Polyox WSR 301) was prepared at 2.0% solids and was added to the emulsion silicone. The silicone was coated out of a 40% solids solution containing 0.64% of the polyethylene oxide at a viscosity of 850 cPs using a slot die onto an uncoated face stock known as Data 70. The applied silicone weight was varied from low to high (Reed 1 - Reed 6) and was measured gravimetrically by weighing the base paper before and after coating to determine the amount applied.

U.S. Patent Appl. No. 09/918,652 (Su et al.)

These samples were made with the same silicone used in the preparation of the samples prepared pursuant to the Reed patent, but without the polyethylene oxide. The silicone was applied to the same Data 70 paper but was applied with a dual slot die as disclosed in Appl. No. 09/918,652, so that the silicone and the support were deposited substantially simultaneously. The amount of silicone applied was varied from low to high (Su et al. 1 - Su et al. 6) and was measured with a mass flow meter.

Silicone Coatweights

The above-described samples were analyzed by x-ray fluorescence in an Oxford instrument to measure silicone on the surface of the paper and not that that has

penetrated into the paper. Thus, the Oxford instrument provides an estimate of the amount of the applied silicone that is actually on the surface of the paper. The following table shows the results of the tests made with the Oxford instrument on the samples produced pursuant to the Reed patent and the samples produced pursuant to the above-captioned patent application. The fact that the flow meter target gsm is slightly lower than the Oxford coatweight gsm for Su et al. 1, 3 and 4 reflects the margin of error between these two measurement techniques and the fact both measured values are very similar (i.e., most of the silicone is on the surface).

Table 1

Sample	Gravimetric coat weight gsm	flow meter target gsm	Oxford coat weight gsm	% on surface
Reed 1	2.66	-	1.10	41.4
Reed 2	2.71	-	1.25	46.1
Reed 3	2.91	-	1.40	48.1
Reed 4	3.61	-	1.50	41.6
Reed 5	4.12	-	1.67	40.5
Reed 6	4.29	-	2.00	46.6
Su et al. 1	-	0.75	0.96	128.0
Su et al. 2	-	1.00	0.99	99.0
Su et al. 3	-	1.25	1.29	103.2
Su et al. 4	-	1.50	1.67	111.3
Su et al. 5	-	1.75	1.72	98.3
Su et al. 6	-	2.00	2.06	103.0

Scanning Electron Micrographs

A scanning electron microscope effectively cuts through the thickness of the paper to expose the layers of the coating and underlying paper fibers. The scanning electron micrograph produced by a scanning electron microscope provides a visual assessment of the locations of the silicone and how much of the silicone is on the surface

of the paper as opposed to how much of the silicone is within the paper. Fig. 1 below is a scanning electron micrograph of the liner produced pursuant to the above-captioned patent application with 1.67 gsm silicone (Su et al. 4) measured by the Oxford instrument. The silicone shows up as a light gray line near the top of the liner shown in the scanning electron micrograph of Fig. 1. At least 50% of the silicone in Fig. 1 is within 1 μ m of the release surface, however there are some domains of the silicone into the support layer. There is no indication that the silicone disperses into the substrate.

Figure 1 Su et al. 4 (1.67 gsm Silicone).

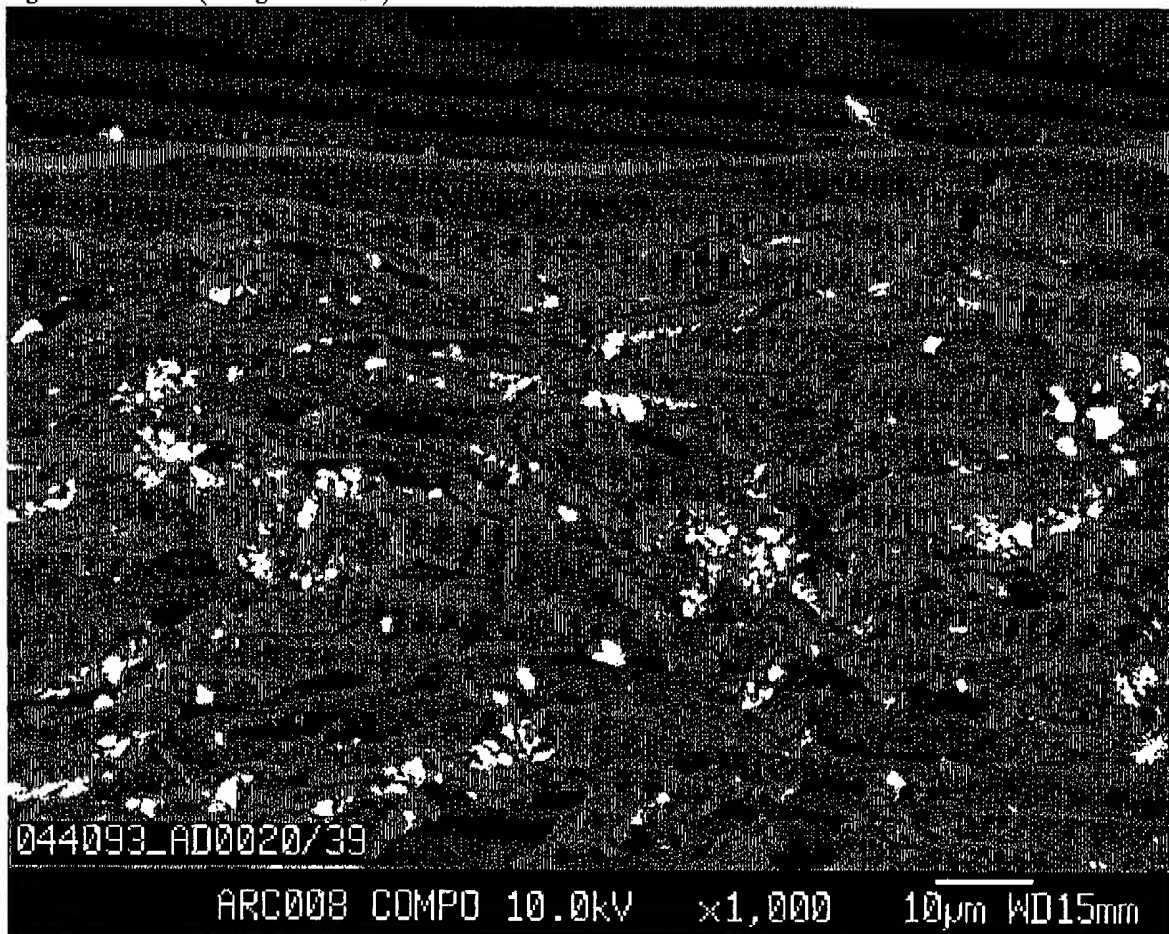
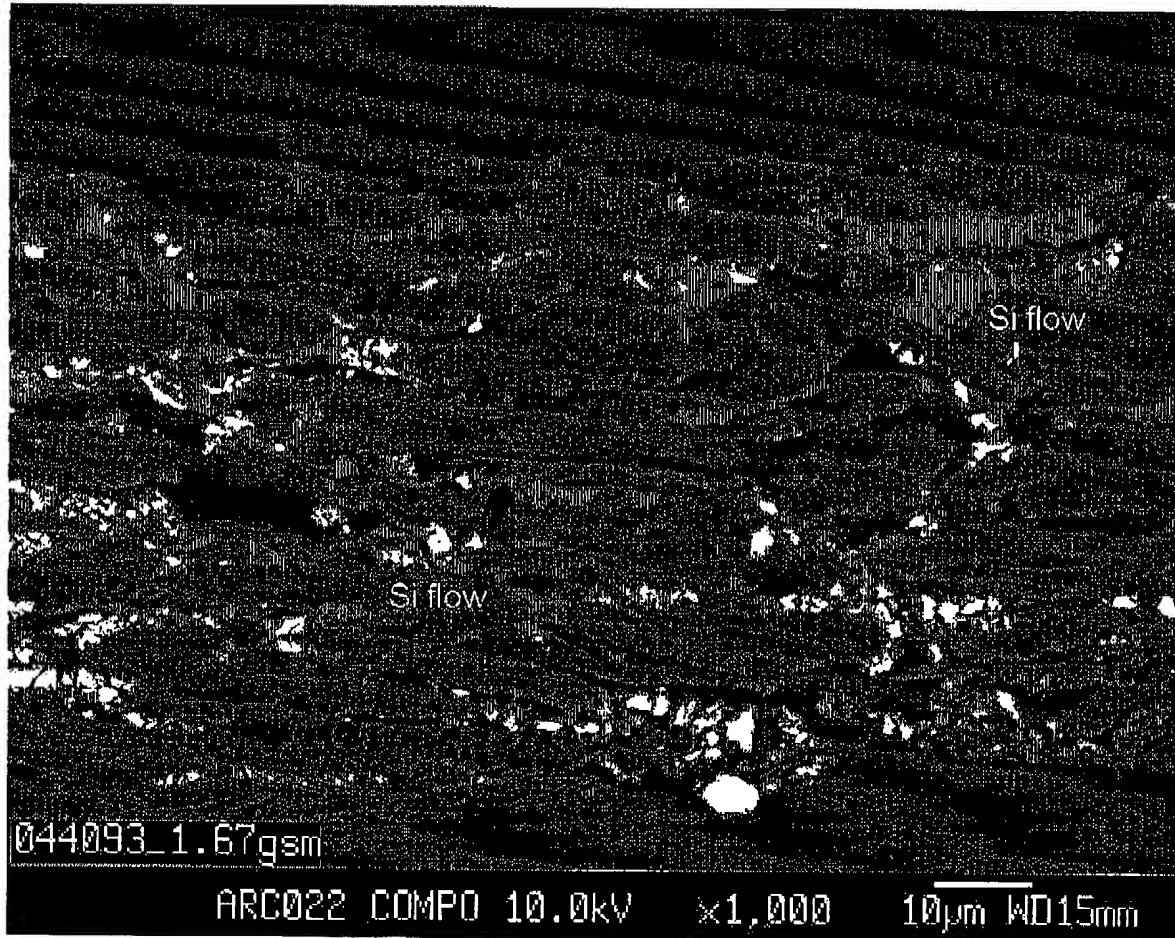


Fig. 2 below is a scanning electron micrograph of the sample produced pursuant to the Reed patent and specifically the sample identified as having an Oxford coatweight of 1.67 gsm (Reed 5). Once again, the silicone is identified as light gray in Fig. 2. However, the silicone does not appear as a discrete layer on the surface of the paper, but rather is distributed throughout the sheet and fills the spaces between the paper fibers. Substantially less than 50% of the silicone of Fig. 2 is within 1 μm of the release surface.

Figure 2 Reed (1.67 gsm Silicone).



Release Tests

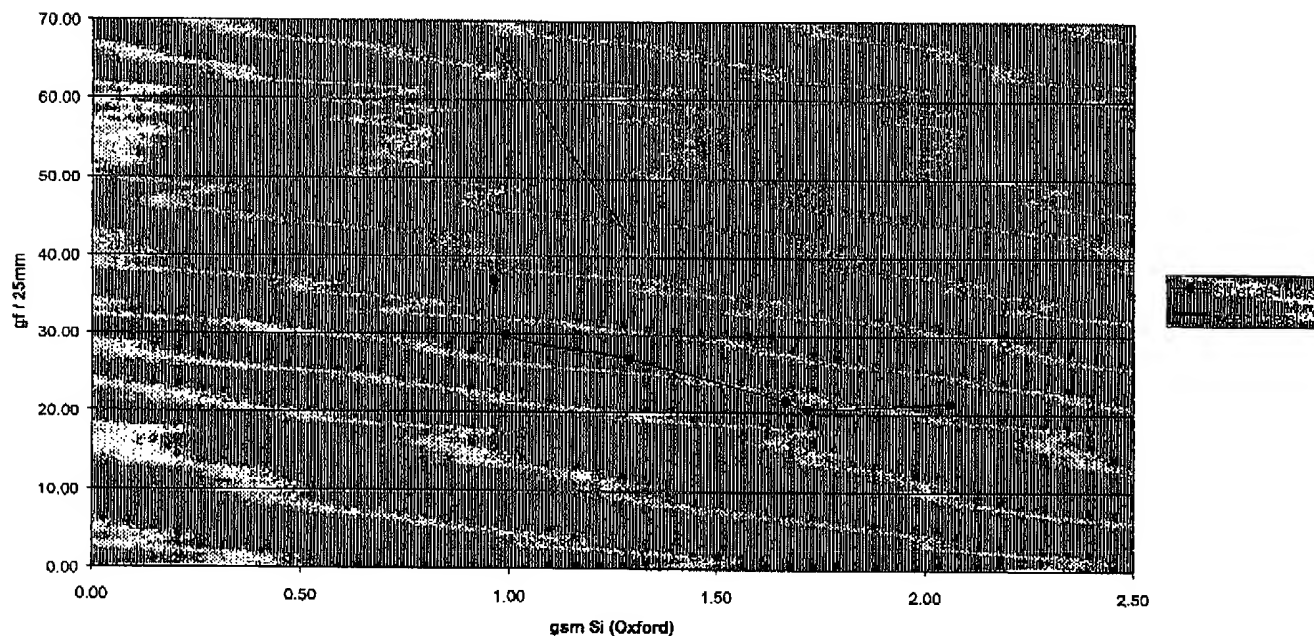
The sample liners were tested for their release properties using a Tesa tape #7475. This is a standard tape used within the release liner industry to measure release properties. The samples were left for twenty four hours at room temperature after coating and before the release force was measured. The following table summarizes the results of the release tests. This table indicates that samples made pursuant to the teaching of the Reed patent with less than 1.50 gsm of silicone (Reed 1 - Reed 3) could not be removed from the Data 70 substrate.

Table 2

Liner	Si cwt	Release average	Release s.d.
Reed 1	1.10	stuck	
Reed 2	1.25	stuck	
Reed 3	1.40	stuck	
Reed 4	1.50	66.4	6.67
Reed 5	1.67	64.78	17.07
Reed 6	2.00	42.38	6.58
Su et al. 1	0.96	36.93	5.25
Su et al. 2	0.99	29.93	1.48
Su et al. 3	1.29	26.80	2.04
Su et al. 4	1.67	21.53	1.40
Su et al. 5	1.72	20.43	1.68
Su et al. 6	2.06	21.30	1.04

The following Fig. 3 graphically demonstrates release characteristics utilizing the Tesa 7475 for different coating amounts.

Fig. 3 Release from Tesa 7475 tape (300 mm/min release speed)

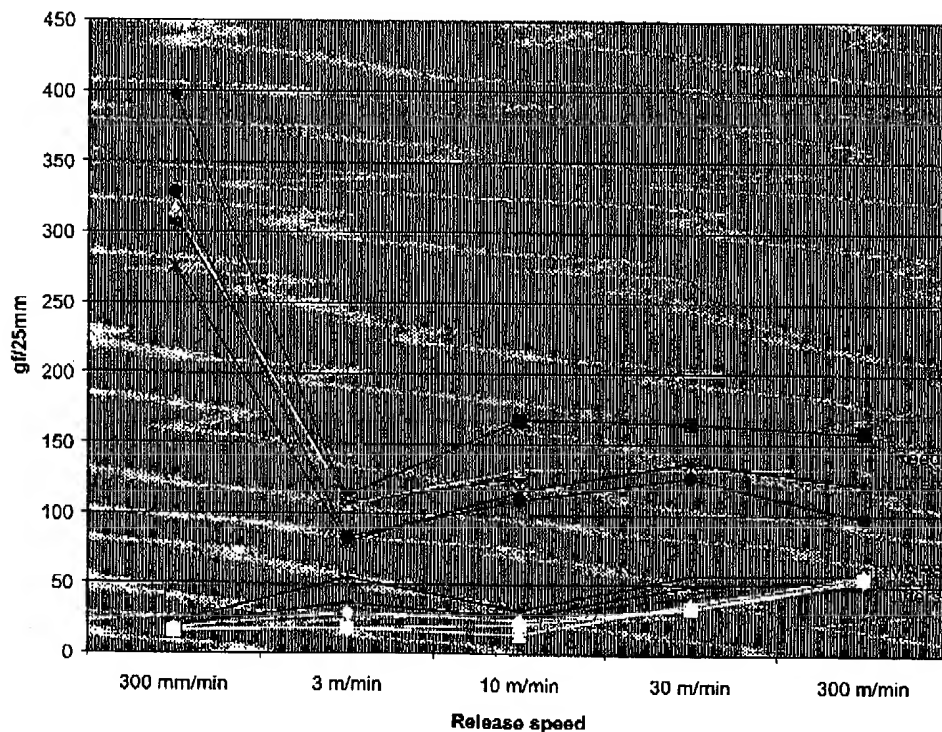


The Samples also were coated with an Avery Dennison emulsion acrylate adhesive, known as S2000N and were laminated with a facepaper. Samples produced in this manner were left to age for twenty four hours and the force required to peel the facepaper from the liner was measured at different speeds of removal for both sets of liners. The results of these tests are shown in Table 3 and Fig. 4 below.

Table 3

Sample	Gravimetric coatweight	flow meter target	Oxford coatweight	300 mm/min	3 m/min	10 m/min	30 m/min	300 m/min
Reed 1	2.66	-	1.10	397	108	126		
Reed 2	2.71	-	1.25	309	113	167	164	158
Reed 3	2.91	-	1.40	315	107	132	132	134
Reed 4	3.61	-	1.50	356	108	100	110	98
Reed 5	4.12	-	1.67	275	80	116	137	121
Reed 6	4.29	-	2.00	328	83	110	126	97
Su et al. 1	-	0.75	0.96	22	54	31	56	57
Su et al. 2	-	1.00	0.99	19	36	26	49	52
Su et al. 3	-	1.25	1.29	17	29	26	41	49
Su et al. 4	-	1.50	1.67	18	29	24	33	53
Su et al. 5	-	1.75	1.72	16	18	21	33	55
Su et al. 6	-	2.00	2.06	17	18	14	36	57

Figure 4 Release for Reed and Su et al. liners using S2000N adhesive



The Oxford instrument data shown in Table 1 and the scanning electron micrographs presented in Figs. 1 and 2 show that much more of the silicone is on or near the surface of the support for the samples produced according to the Su et al. application. The tests summarized in Tables 2 and 3 and Figs. 3 and 4 show very enhanced release characteristics for samples made pursuant to the Su et al. application.

Fig. 1 above shows a fairly well defined demarcation between the release layer and the support layer as indicated by the light gray and darker gray near the top of the scanning electron micrograph in Fig. 1. Small domains of silicone, however, are shown as being deposited in the support layer and help to anchor the release layer to the support layer. Anchoring of the release layer to the support layer can be assessed in a Durlac rub-off test. The test involves measuring the coatweight with an Oxford XRF analyzer. The sample then is dragged across a felt pad under a weight for a selected number of times. The silicone coatweight then is re-measured. The difference in coatweight before and after rubbing indicates the amount of silicone that has been removed during the rub-off test.

Table 4 summarizes the results of three rub-off tests.

Table 4

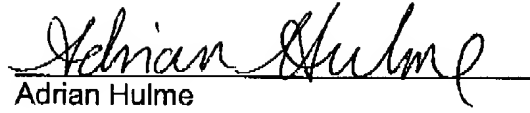
Liner	Silicone	Base	Remarks	Sheet weight (g/m ²)	Durac (%)
1. glassine	emulsion Si @ 1.0 gsm	-	plain emulsion silicone	1.1	4.5
2. glassine	emulsion Si @ 1.0 gsm	latex @ 0.5 2. gsm	Su et al. at lower latex level	1.3	39.3
3. glassine	emulsion Si @ 1.0 gsm	latex @ 6.0 gsm	Su et al.	1.0	99.6

Test 1 relates to the direct coating of a silicone-containing release layer on a glassine liner, and hence compares to the single coating taught by Reed. Tests 2 and 3 relate to the dual die coating where a support layer and a release layer are applied substantially simultaneously by a dual die. Tests 2 and 3 differ from one another with respect to the amount of latex. The right column in Table 4 shows the amount of silicone remaining after the Durlac rub-off test as a percentage of the original silicone coatweight. A high percentage number in the right column is indicative of a secure anchoring of the silicone to the release layer. A low number is indicative of poor anchoring and easy separation of the silicone from the substrate. Table 4 shows a very substantial improvement in the anchoring of the silicone-containing release layer on the test samples produced according to the dual die coating method disclosed in the above-referenced U.S. Patent Appl. No. 09/908,652.

I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements will jeopardize the validity of

the application and any patent issued thereon.

Date: 7/21/04


Adrian Hulme